INDUSTRIAL HYGIENE INFORMATION AND REGULATORY ACTIONS SUMMARY

January 2005

REGULATORY ACTIONS

OSHA Schedules Public Hearings on Hexavalent Chromium

OSHA is holding public hearings in Washington, D.C. to discuss the agency's proposed rulemaking for occupational exposure to hexavalent chromium.

OSHA is proposing to lower its permissible exposure limit (PEL) for hexavalent chromium and for all Cr (VI) compounds in construction, shipyards, and general industry from 52 to one microgram of Cr (VI) per cubic meter of air as an 8-hour time weighted average. The proposed rule also includes provisions for employee protection such as preferred methods for controlling exposure, respiratory protection, protective work clothing and equipment, hygiene areas and practices, medical surveillance, hazard communication, and recordkeeping.

Hexavalent chromium Cr (VI) compounds are widely used in the chemical industry in pigments, metal plating, and chemical synthesis as ingredients and catalysts. Cr (VI) can also be produced when welding on stainless steel or Cr (VI)-painted surfaces. The major health effects associated with exposure to Cr(VI) include lung cancer, asthma, nasal septum ulcerations and perforations, skin ulcerations (or chrome holes), and allergic and irritant contact dermatitis.

The proposed rule is available on OSHA's web site at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=18238.

Semiannual Regulatory Agenda Published

OSHA unveiled its regulatory priorities for the next year as part of the Department of Labor's unified agenda that was published in the Federal Register on December 13, 2004. The semiannual regulatory agenda outlines work on new standards, including Beryllium and Emergency Response and Preparedness.

Items may be found quickest by using the "Regulation Identification Number" noted. Following are the items on the agenda.

Sequence Number	Title	Regulation Identification Number
Prerule Stage		
2028	Occupational Exposure to Ethylene Oxide (Section 610 Review)	1218-AB60
2029	Occupational Exposure to Crystalline Silica (Reg Plan Seq No. 99)	1218-AB70
2030	Occupational Exposure to Beryllium	1218-AB76
2031	Excavations (Section 610 Review)	1218-AC02
2032	Ionizing Radiation	1218-AC11
2033	Emergency Response and Preparedness	1218-AC17
2034	Lead in Construction (Section 610 Review)	1218-AC18
Proposed Rule Stage		
2035	Occupational Exposure to Hexavalent Chromium (Preventing Occupational Illness: Chromium) (Reg Plan Seq No. 100)	1218-AB45
2036	Confined Spaces in Construction (Part 1926): Preventing Suffocation/ Explosions in Confined Spaces	1218-AB47
2037	General Working Conditions for Shipyard Employment	1218-AB50
2038	Electric Power Transmission and Distribution; Electrical Protective Equipment	1218-AB67
2039	Walking Working Surfaces and Personal Fall Protection Systems (1910) (Slips, Trips, and Fall Prevention)	1218-AB80
2040	Cranes and Derricks	1218-AC01
2041	Explosives	1218-AC09
Final Rule Stage		
2042	Assigned Protection Factors: Amendments to the Final Rule on Respiratory Protection (Reg Plan Seq No. 101)	1218-AA05
2043	Longshoring and Marine Terminals (Parts 1917 and 1918) -- Reopening of the Record (Vertical Tandem Lifts (VTLs))	1218-AA56
2044	Employer Payment for Personal Protective Equipment	1218-AB77

Sequence Number	Title	Regulation Identification Number
2045	Standards Improvement (Miscellaneous Changes) for General Industry, Marine Terminals, and Construction Standards (Phase II) (Reg Plan Seq No. 102)	1218-AB81
2046	Revision and Update of Subpart S -- Electrical Standards	1218-AB95
2047	Updating OSHA Standards Based on National Consensus Standards	1218-AC08
2048	Procedures for Handling Discrimination Complaints Under Section 6 of the Pipeline Safety Improvement Act of 2002	1218-AC12
2049	Oregon State Plan	1218-AC13
2050	Slip Resistance of Skeletal Structural Steel	1218-AC14
2051	Rollover Protective Structures; Overhead Protection	1218-AC15
2052	NFPA Standards in Shipyard Fire Protection	1218-AC16
Long-Term Actions		
2053	Hearing Conservation Program for Construction Workers	1218-AB89
Completed Actions		
2054	Fire Protection in Shipyard Employment (Part 1915, Subpart P) (Shipyards: Fire Safety)	1218-AB51
2055	Controlled Negative Pressure Fit Testing Protocol: Amendment to the Final Rule on Respiratory Protection	1218-AC05
2056	Procedures for Handling Discrimination Complaints Under Section 806 of the Corporate and Criminal Fraud Accountability Act of 2002	1218-AC10

You may find the complete regulatory agenda on OSHA's web site at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=18295.

LEGISLATIVE ACTIONS OF INTEREST

AIHA Governmental Affairs "Happenings" Legislative Items of Interest

New Congress Convenes

The 109th Session of Congress convened in early January with a few new faces, but is generally looked upon as "more of the same". With Republicans increasing their slim majority by a small number, most believe that three major issues – tax reform, tort reform and social security, will dominate the first year of this session. Add to this the continuing situation in Iraq and most do not expect issues like occupational health and safety to receive much attention.

The administration has already hinted that the fiscal year '06 budget will be very tight. Early talk is that most programs will be level-funded and many others will actually receive a decrease.

As to who will be controlling the agenda for occupational health and safety, it may be a little early to tell. What we do know is that Senator Michael Enzi (R-WY) has moved up from subcommittee chairman to full committee chair of the Senate Health, Education, Labor and Pensions Committee. While we hoped this would mean even more of a focus on issues of importance to industrial hygiene, it now looks as if this may not be the case. Most believe the full committee will have a full plate dealing with the issue of pensions. And some say that Senator Enzi will not move forward with his previous offerings of the "SAFE Act". As for the subcommittee chairmanship, the committee has yet to meet to determine who will chair this subcommittee. The top name being talked about at this time is Senator John Ensign (R-NV). Senator Ensign has not shown a particular interest in OSHA issues in the past, so will just have to wait and see what transpires.

In the House, few changes are coming. Rep. Charlie Norwood (R-GA) will still lead the subcommittee overseeing OSHA. Rep. Norwood has indicated he will move his OSHA reform bills through the House as soon as possible. In the last session, Rep. Norwood saw his bills easily pass the House, only to be stopped cold in the Senate with no one taking the lead. Unfortunately for Rep. Norwood, the same could hold true this time around.

OSHA ACTIVITIES

FY2006 Budget Request Emphasizes Enforcement, Compliance Assistance

President Bush has requested a $467 million budget for the OSHA in Fiscal Year 2006. The request represents an increase of $2.8 million from last year's appropriation and includes increases in state plan compliance assistance programs and data analysis and performance measurement.

"The President's proposed budget provides us the resources we need to continue making a positive impact on workplace safety and health, while still maintaining fiscal responsibility," Acting Assistant Secretary of Labor for OSHA Jonathan Snare said. "This is a strong and sound budget that reinforces our leadership in worker safety and health while supporting OSHA's balanced approach that emphasizes strong, fair and effective enforcement; outreach, education and compliance assistance; and cooperative and voluntary programs."

The President's proposed budget underscores the importance of OSHA's enforcement program, funding a planned 37,700 workplace inspections throughout FY 2006. The proposal also includes $1 million to expand the compliance assistance programs of states operating their own OSHA programs. The added monies will enable state plan states to add new compliance assistance positions that can focus on establishing more Voluntary Protection Programs sites, new cooperative agreements and expand training and outreach.

Enhancing OSHA's data collection and analysis capabilities is the impetus behind a $1 million increase to the agency's safety and health statistics budget. The key advantage gained by the increase will be the ability of the agency to begin developing a predictive model to allow the agency to report performance measurement data shortly after the close of the fiscal year.

OSHA's FY 2006 budget also calls for the reduction of $10.2 million by eliminating the agency's Susan Harwood training grants program. Snare explained that OSHA has a variety of outreach, compliance assistance and training programs. Many of OSHA's Alliances address training components, while the agency's web-based training materials continues to expand. The agency also offers training through the OSHA Training Institute, 19 Education Centers and train-the-trainer Outreach Training Program that reaches more than 360,000 workers annually. "The availability and success of these programs and capabilities within a constrained budget environment," he said, "will ensure that training and outreach to thousands of workers and employers is not compromised by the elimination of the training grants program."

Here is a look at the 2006 proposal (courtesy of AIHA Governmental Affairs):

BUDGET AUTHORITY – OSHA

(Dollars in Millions)

	FY2005	FY2006	Change
Safety and Health Standards	$16.0	$16.6	$0.6
Federal Enforcement	169.7	174.3	4.6
State Programs	91.0	92.0	1.0
Technical Support	20.7	21.7	1.0
Federal Compliance Assistance	70.9	73.3	2.4
State Consultation Grants	53.4	53.9	0.5
Training Grants	10.2		(10.2)
Safety and Health Statistics	22.2	24.5	2.3
Executive Direction and Administration	10.1	10.7	0.6
Total, OSHA Budget Authority	$464.2	$467.0	$2.8
Full Time Equivalents (FTEs)	2,208	2,208	

OSHA Workers Tainted by Beryllium Exposure

Source: Chicago Tribune, January 17, 2005, p8, http://pqasb.pqarchiver.com/chicagotribune/index.html?ts=1108473099.

OSHA, long criticized for downplaying the dangers of beryllium, has discovered that several of its employees have been affected by exposure to the deadly metal. The Tribune has learned that ongoing medical testing shows that at least three OSHA workers have developed blood abnormalities linked to beryllium exposure - the first such cases at the agency. The workers are thought to have been exposed while conducting safety inspections in industries using beryllium, a lightweight metal whose dust can cause an often-fatal lung disease. OSHA estimates that 1,000 inspectors, or three-fourths of its force, have conducted inspections in industries handling the metal.

People who have blood abnormalities don't necessarily have beryllium disease; the abnormalities mean the body's immune system has reacted to beryllium exposure.

Further tests, such as a lung biopsy, are needed to confirm illness. Experts estimate about half the people with blood abnormalities will develop the disease.

OSHA did not test its workers until after a top agency official, Adam Finkel, filed a whistle-blower complaint on the matter in 2003, alleging that he was transferred because he was advocating a safety plan OSHA higher-ups didn't want. The agency denied the claim, and the case was settled. Finkel said he was saddened to learn some workers have developed blood abnormalities, but "it's exactly what I said would happen." He said OSHA officials knew inspectors were exposed to high levels of beryllium dust and that agency officials should have offered testing sooner. "They let them twist in the wind for many years," he said.

To date, OSHA has tested 265 current employees. The agency would not comment on whether it would expand testing to include former inspectors. "When we have all the results in, we'll be taking a look at it and will be making revisions as necessary," said Ruth McCully, the agency's director of science, technology and medicine.

Beryllium experts urge that everyone exposed be tested. There is no cure for beryllium disease, but early detection can aid treatment. Symptoms include shortness of breath and fatigue, and some people eventually cannot breathe without the aid of an oxygen tank. About 1,300 people have contracted the disease since the 1940s.

NIOSH ACTIVITIES

Surgeon General's Workshop on Healthy Indoor Environment

In the early 1990s, NIOSH joined with the U.S. Environmental Protection Agency in developing a guidebook to help building owners and managers prevent, identify, and correct indoor air problems; this manual, available on the NIOSH web site at http://www.cdc.gov/niosh/baqtoc.html, is still widely used. More dramatically, results from scores of Health Hazard Evaluations (HHEs) and other NIOSH research studies underpin much of today's scientific literature on remediating indoor environmental problems in offices, schools, government buildings, and other non-industrial workplaces.

NIOSH's leadership was recognized again last month when Surgeon General Richard Carmona convened a two-day Surgeon General's Workshop on Healthy Indoor Environment on the campus of the National Institutes of Health (NIH) in Bethesda, Maryland. NIOSH researchers helped plan the conference, participated in the January 12-13 discussions on the current priority research needs for improving the health of employees in indoor environments, and joined with other participants to suggest next steps for ensuring healthier indoor environments for all Americans.

Concerns have risen significantly over the past two decades in regard to chemical off-gassing, mold, environmental tobacco smoke, and other indoor pollutants. As Dr. Carmona noted in his remarks, one gauge of this trend can be found in the requests that come to NIOSH for technical assistance under the Health Hazard Evaluation program. In just the past 25 years, the percentage of HHEs related to indoor-air quality

has increased from 0.5 percent of all evaluations in 1978, to 52 percent of all evaluations since 1990. This means that in the past three decades, the evaluations related to air quality concerns have increased from one of every 200 evaluations to one of every two.

In its formal workshop presentation, NIOSH identified several high priority research needs related to healthy indoor environments:

- Identifying critical indoor exposures, understanding relationships between exposures and health, and developing preventive strategies for:
  - Mucous membrane irritation, headaches, and fatigue – typical symptoms of "sick building syndrome."
  - Communicable respiratory illnesses in indoor environments, such as influenza and the common cold.
  - Building-related allergies and asthma.
- Understanding how the design, operation, and maintenance of buildings and the activities of occupants affect the concentration of indoor pollutants.
- Identifying and evaluating strategies to reduce barriers and increase incentives for health-protective building practices.

These needs are very much reflected in our indoor environment research planning. Further information on NIOSH's indoor environmental quality research program is available at http://www.cdc.gov/niosh/topics/indoorenv/.

Study Links Interns' Long Work Shifts and Risk of Motor Vehicle Crashes

First-year doctors in clinical training, or medical interns, who work shifts of longer than 24 hours are more than twice as likely to have a car crash leaving the hospital and five times as likely to have a "near miss" incident on the road as medical interns who work shorter shifts, according to a study co-funded by NIOSH that was reported in the January 13 issue of the New England Journal of Medicine.

The article, "*Extended Work Shifts and the Risk of Motor Vehicle Crashes among Interns*," is the third in a series of studies on the impact of extended work hours and fatigue upon interns conducted by the Divisions of Sleep Medicine at the Brigham and Women's Hospital and the Harvard Medical School in Boston. All three were co-funded by NIOSH and the Agency for Healthcare Research and Quality in the U.S. Department of Health and Human Services. The new article is available on line at http://content.nejm.org/cgi/content/full/352/2/125?ijkey=zfWstEgGAt2tY&keytype=ref&siteid=nejm.

EPA ACTIVITIES

EPA Finds Potential Teflon Chemical Risks

The Seattle Post-Intelligencer reported that the Environmental Protection Agency is considering whether there is "a potential risk of developmental and other adverse effects" from exposure to low levels of a chemical used in making the nonstick substance Teflon. EPA officials emphasized, however, that the agency's draft assessment of the potential risks of perfluorooctanoic acid and its salts, known as PFOA, or C-8, is preliminary. The report, based on animal studies, is being sent to outside experts for helping in resolving scientific issues in order to determine the potential risks. While PFOA is used to make Teflon, it is not present in Teflon itself, which is applied to cookware, clothing, car parts and flooring. (CHPPM HIO Weekly Update – January 14, 2005)

EPA Announces New Aircraft Drinking Water Quality Data

A second round of EPA testing shows that 17.2 percent of 169 randomly selected passenger aircraft carried water contaminated with total coliform bacteria. The latest round of tests were performed on domestic and international passenger aircraft at airports nationwide in November and December of last year. The results confirm the presence of bacteria at levels warranting continued EPA scrutiny.

The information released today is intended to help the public make informed decisions while traveling on aircraft. Passengers with compromised immune systems or others concerned may want to request canned or bottled beverages and refrain from drinking tea or coffee unless made with bottled water.

Total coliform and *E. coli* are indicators that other disease-causing organisms (pathogens) may be present in the water and could potentially affect public health. When sampling identified total coliform in the water of a domestic aircraft, that aircraft was disinfected and retested to ensure that the disinfection was effective. In instances where foreign flag aircraft tested positive for total coliform, those airline companies were notified of the positive test results and advised to disinfect and retest the aircraft.

As part of the first round of sampling, EPA, during August and September 2004, randomly tested the water supplies on 158 aircraft nationwide. Aircraft tank water is used in the galleys and lavatory sinks. Initial testing of onboard water supplies revealed 20 aircraft (12.7 percent) with positive results for total coliform bacteria, with two of these aircraft also testing positive for *E. coli*. Following those tests, EPA announced that further testing would take place, and efforts were undertaken to reach agreements with airlines to more closely monitor water quality on planes.

In EPA's second round of water quality sampling, 169 aircraft were tested. The sampling included water from galley water taps as well as lavatory faucets. Testing found that 29 of these aircraft (17.2 percent) were total-coliform-positive. *E. coli* was not found in the 169 aircraft included in the second round. Adding together the results

of the first and second rounds of testing, EPA tested 327 aircraft in 2004, with approximately 15 percent found to be total-coliform-positive.

Following the first round of airline water testing in November 2004, EPA announced that agreements had been signed with the following airlines to increase monitoring of water quality testing and disinfecting processes: Alaska Airlines, Aloha Airlines, American Airlines, America West, ATA Airlines, Continental Airlines, Hawaiian Airlines, JetBlue, Midwest Airlines, Northwest Airlines, United Airlines and US Airways. Two additional airlines, Delta Airlines and Southwest Airlines, are currently negotiating separate agreements with EPA. Collectively, these 14 carriers represent the majority of U.S. flag carrying aircraft transporting the flying public. The agency will continue to work with smaller, regional and charter aircraft carriers to address drinking water quality with agreements similar to those reached with Air Transport Association members. These agreements will govern airline drinking water safety until additional regulations are completed.

EPA began a review of existing safe drinking water guidance to airlines in 2002. In response to the aircraft test results, EPA is conducting a priority review of existing regulations and guidance. The agency is placing specific emphasis on preventive measures, adequate monitoring and sound maintenance practices such as flushing and disinfection of aircraft water systems. For more information on the regulation of water supplies aboard passenger aircraft and to view publicly available testing data, visit http://www.epa.gov/airlinewater/.

President Proposes $7.6 Billion Budget for EPA

President Bush's 2006 budget provides $7.6 billion for the Environmental Protection Agency and its partners across the nation. EPA Acting Administrator Steve Johnson said that the budget supports the Agency's core work of protecting public health and improving the environment, addresses needs identified in the EPA's Strategic Plan, and increases resources for EPA's critical role in security against terrorist acts. EPA summarized the impacts as follows:

To help increase security against potential terrorist acts, the President's Budget provides:

- A $79 million increase in new resources for EPA homeland security efforts over the 2005 budget, to ensure that EPA's critical role is made a top priority. Included in the $79 million increase in Homeland Security funding is:
    - $44 million to launch a pilot program of monitoring and surveillance in select cities to provide early warning of contamination;
    - An increase of $19.4 million for environmental decontamination research and preparedness, with an additional $4 million requested for the Safe Buildings research program; and
    - More than $11.6 million in new resources to support preparedness in our environmental laboratories.

To address the high priority of reducing nitrogen oxide, sulfur dioxide and mercury emissions, the President's budget provides:

- That EPA will continue to support the enactment of the Clear Skies legislation, and should legislation not be enacted soon, to finalize the proposed Clean Air Interstate Rule.

To reduce emissions from trucks and other mobile sources, the President's budget provides:

- $15 million for the national Clean Diesel Initiative, which will be leveraged significantly by working with their partners. EPA and a coalition of clean diesel interests will work together to expand the retrofitting of diesel engines in new sectors.

To ensure cleaner lands and economic revitalization through waste site cleanups, the President's budget provides:

- $210 million for the national Brownfields Program, an increase of $46.9 million over enacted 2005 funding. Under this program, EPA is working with its state, and local partners to meet its objective to sustain, clean up and restore contaminated properties and abandoned sites.

Together with the extension of the Brownfields tax credit, EPA expects to achieve the following in FY 2006:

- Assess 1,000 Brownfields properties;
- Clean up 60 properties using Brownfields funding;
- Leverage an additional $1 billion in cleanup and redevelopment funding; and
- Create 5,000 jobs related to the Brownfields efforts.

To ensure cleaner, safer water, the President's budget provides:

- $2.8 billion to improve the quality of surface and drinking waters by expanding the nationwide monitoring network and taking watershed-wide approaches to water quality protection;
- $730 million for the Clean Water State Revolving Fund to support sustainable wastewater infrastructure; and
- $73 million for the Great Lakes programs and regional collaboration. That amount includes $50 million for the Great Lakes Legacy Act program to remediate the contaminated sediment in Areas of Concern such as the Black Lagoon in the Detroit River.

For the Summary of EPA's FY2006 budget request with additional specific program-related information visit http://www.epa.gov/budget/.

EPA Issues Documents on Ozone and PM Air Quality Standards

As part of a process to ensure that EPA air quality standards reflect the latest air pollution and health effects research and science, the Agency issued draft documents on ground-level ozone and particulate matter (PM), two of the six criteria air pollutants regulated under CAA, for public review and comment. EPA is releasing the first external review draft of the "*Air Quality Criteria for Ozone and Other Photochemical Oxidants*" for a 90-day public comment period and expert external scientific peer review. The Agency is also issuing the second draft staff assessment of the policy implications of the latest scientific and technical information about PM or particle pollution. The documents do not change current standards; they are preliminary steps that could lead toward future air quality policy decisions.

Process for Developing National Ambient Air Quality Standards

The Clean Air Act (CAA) requires EPA to periodically review its National Ambient Air Quality Standards. The review process is thorough and deliberate. EPA's Office of Research and Development (ORD) and the Office of Air and Radiation (OAR) each play important roles in air quality standard review and development. First, ORD develops an "Air Quality Criteria Document (AQCD)" a compilation and evaluation of the latest scientific knowledge useful in assessing the health and welfare effects of the air pollutant. In developing this document, EPA must consider the advice of the Clean Air Scientific Advisory Committee (CASAC) a review committee created under CAA and part of EPA's Science Advisory Board (SAB). Based on the criteria document, the advice of CASAC and public comment, EPA then develops a "staff paper" that helps translate the science into terms that can be used for making policy decisions. The staff paper, prepared by OAR, includes recommendations to the EPA Administrator about any revisions to the standards that might be needed to ensure that they protect public health with an adequate margin of safety, as well as protecting the environment and the public welfare.

Before either the criteria document or staff paper can be used as the basis for any policy decisions, they undergo rigorous review by the scientific community, industry, public interest groups, the general public and CASAC. Based on the scientific assessments in the criteria document and on the information and recommendations in the staff paper, the EPA Administrator determines whether it is appropriate to propose revisions to the standards. More information on this process is available online at: http://www.epa.gov/ttn/oarpg/naaqsfin/naaqs.html.

Draft Air Quality Criteria Document for Ozone

EPA has released the first external review draft of the "*Air Quality Criteria for Ozone and Other Photochemical Oxidants*," for a 90-day public comment period and expert external scientific peer review. Tropospheric or surface-level ozone is formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) (ozone precursors) react in the atmosphere in the presence of sunlight. Ozone can irritate the respiratory system, reduce lung function, and aggravate asthma. The draft criteria document

revises the 1996 ozone AQCD, which was the basis for the current ozone standards set in 1997.

The CASAC will review this draft criteria document at a public meeting, anticipated to take place in May 2005. The date and arrangements for the CASAC meeting will be announced by the SAB. The draft document is available online at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=114523.

Second Draft 'Staff Paper' for Particulate Matter

EPA released its second draft staff assessment of the policy implications of the latest scientific and technical information about PM or particle pollution. This draft document, or "Staff paper," is part of EPA's regular review of its National Ambient Air Quality Standards for particulate matter. It presents draft recommendations for retaining or tightening the suite of PM standards for the EPA Administrator's consideration. The second draft's recommendations include potential revisions to fine and inhalable or "thoracic" coarse particle standards and consideration of a short-term secondary standard for fine particles to protect visibility in urban areas.

This draft document does not change any of the national air quality standards for particle pollution currently in effect. The CASAC will provide comment on this second draft of the staff paper at a meeting to be held in April 2005. This meeting will be open to the public who may provide comment as well. EPA will integrate comments into a final staff paper.

The final staff paper will provide recommended options for the Administrator to consider. The Administrator will propose action on the particle standards by December 20, 2005. This may or may not involve changing the standards. EPA will finalize this review by Sept. 27, 2006.

More information on the second draft staff paper for particulate matter is available online at: http://www.epa.gov/airlinks/airlinks4.html#pmstaff2.

Recent and Upcoming Regulations to Improve Air Quality

EPA has taken significant actions to help all areas across the country significantly improve air quality by reducing ozone and particulate matter. These national clean air programs include:

- In April 2004, EPA set new more protective standards for ground-level ozone and designated areas in the United States that do not meet that standard.
- In December 2004, the Agency established the first national standard for fine particles (PM2.5) and designated areas that do not meet the new standard.
- EPA's regional ozone transport rule, known as the NO_x SIP Call, will significantly reduce NO_x emissions in 19 eastern states and the District of Columbia by approximately 600,000 tons starting in the summer of 2004 and by nearly 1 million tons when fully implemented.

- The President's Clear Skies legislation would bring many areas into attainment with the fine particle and ozone standards. EPA has also proposed a rule, the Clean Air Interstate Rule, which would also bring many areas into attainment with the new air quality standards in the eastern states. EPA expects to issue this as a final rule in March 2005.
- Clean Air Diesel Rules targeting diesel emissions from on road and off road diesel engines will help to significantly cut NO_x and particulate matter emissions nationwide.
- EPA is phasing in stringent tailpipe standards for cars, trucks and SUVs that also reduce NO_x and VOC emissions.

For more information on these actions, visit: http://www.epa.gov/cleanair2004/.

TECHNICAL ARTICLES OF INTEREST

Respiratory Demand During Rigorous Physical Work in CPE

Citation: "*Respiratory Demand During Rigorous Physical Work in a Chemical Protective Ensemble*", J. Kaufman and S. Hastings, Journal of Occupational and Environmental Hygiene, 2005, 2:2, p 98 - 110, http://ujoeh.metapress.com/link.asp?id=k7na8ava9tcck45w

Abstract: "Protection afforded by a respirator filter depends on many factors, among them chemical or biological agent and flow rate. Filtration mechanisms, such as chemical adsorption, depend on sufficient residence time for the filter media to extract noxious agents from the airstream. Consequently, filter efficiency depends on inspiratory air velocities, among other factors. Filter designs account for this by adjusting bed depth and cross-sectional area to anticipated flow rates. Many military and commercial filters are designed and tested at 32 - 40 Liters/minute (L/min). The present study investigated respiratory demand while U.S. Marines completed operationally relevant tasks in chemical protective ensembles, including M-40 masks and C2A1 filters. Respiratory demand greatly exceeded current test conditions during the most arduous tasks: minute ventilation=96.4±18.9 L/min (mean±SD) with a maximum of 131.7 L/min observed in one subject. Mean peak inspiratory flow rate (PIF) reached 238.7±34.0 L/min with maximum PIF often exceeding 300 L/min (maximum observed value=356.3 L/min). The observed respiratory demand was consistent with data reported in previous laboratory studies of very heavy workloads. This study is among the few to report on respiratory demand while subjects perform operationally relevant tasking in chemical protective ensembles. The results indicate that military and industrial filters will probably encounter higher flow rates than previously anticipated during heavy exertion."

Background: Efficiency in fixed-bed chemical filters commonly used in commercial and military air-purifying respirators (APRs) is highly dependent on residence time, that is, the length of time for a molecule to traverse the filter bed. The longer a molecule remains in the filter bed, the greater the likelihood it will be removed from the

airstream by adsorption onto the active carbon bed or physically imbedded on the filter matrix. Residence time decreases as the velocity of the airstream increases. The velocity of the airstream through a filter is the volumetric flow rate divided by the cross-sectional area of the filter. Hence, as the volumetric flow rate through the filter increases, the breakthrough time or life of the filter decreases. Therefore, excessive flow rates can overwhelm a filter bed, increasing the risk of injury to the APR user. Typical APR design primarily exposes filters to chemical contaminants during inspiration, since a separate pathway (exhalation valve) directs expired air out of the APR.

Designing appropriate chemical filters for occupational use depends on the anticipated respiratory demands produced by related tasks. Consequently, characterizing representative respiratory demand is crucial for designing and testing chemical filters. Unfortunately, there is a dearth of data available on respiratory airflows in an actual occupational setting, particularly where the greatest demands are placed on APR chemical filters, that are, physically demanding tasks.

Current U.S. military testing criteria use a steady flow of 32 L/min as the basis for filter assessment during exposure to a variety of chemical warfare agents (CWAs), toxic industrial chemicals (TICs), and toxic industrial materials (TIMs). NIOSH filter test criteria for testing civilian APR filters against various classes of TICs and TIMs were recently raised to 64 and 100 L/min, respectively, yet complete APRs (including filter) are to be tested against CWAs (mustard [HD], sarin [GB]) at 40 L/min flow rate. It is unclear why such relatively low flow rates (32 or 40 L/min) were chosen as the basis for filter testing against CWAs. Recent concerns raised by the U.S. Marine Corps (USMC) Chemical Biological Incident Response Force (CBIRF) and other Technical Support Working Group members suggest that this may underestimate actual respiratory demands during field use and that filters tested to this criterion may not provide adequate protection to the user. This study was intended to quantify respiratory demands in CBIRF personnel performing mission-related tasks while wearing chemical/biological protection typically used in the field.

Methods: Subjects performed physical tasks on 3 consecutive days. A variety of problems caused Day 1 to serve as a shakedown for the subsequent experimental trials on Days 2 and 3. The subject pool was split into two groups on Day 2, with groups completing either a simulated decontamination process (DECON) or a reconnaissance patrol (RECON) to represent light/moderate workload tasks. Each task (DECON or RECON) took 60 min to complete. Day 3 had all participants performing a modified version of the Fire Service Joint Labor Management Wellness/Fitness Initiative Candidate Physical Ability Test (CPAT), high workload tasks taking approximately 15 minutes to complete, including: stair climb, hose drag, equipment carry, ladder raise, hose hoist, forcible entry, search, rescue, and ceiling reach and pull.

Forty-eight CBIRF members volunteered to participate. Baseline pulmonary health and physical fitness were assessed in each subject with a pulmonary function test and the Forestry Step Test, a submaximal oxygen consumption test. The Forestry Step Test is a variant of the Harvard and Åstrand-Ryhming step tests in which an age-adjusted fitness

score (predicted maximal oxygen consumption) is determined from the recovery heart rate measured after 5 min of stepping.

Each subject wore standard USMC Mission Oriented Protective Posture level 4 (MOPP 4) individual protective ensembles based on the Saratoga chemical protective overgarment with an APR (M-40 mask with C2A1 filter) during all trials. All subjects had previously completed extensive CBIRF training in the proper use and fitting of MOPP 4 equipment and used their own previously issued M-40 masks to ensure proper fit. The pressure drop across a new C2A1 cartridge was 5.20 ± 0.14 cm H_2O at a nominal flow rate of 82 L/min (compared with 5.39 ± 0.19 cm H_2O for filters after use in this study). In addition, webbing with pockets was worn to carry instrumentation. The total weight of clothing and equipment was 11.0 ± 0.5 kg. An additional 22.7 kg (50 lbs) weighted vest was worn throughout the CPAT trials and augmented by an additional load of 22.7 kg (50 lbs) worn only during CPAT event #1 (stair climb).

Inspiratory flow rate data were measured continuously during trials with a turbine flowmeter and recorded at a rate of 50 Hz. Flow meters were calibrated with a flow rate calibrator and checked against a computer-controlled sinusoidal breathing machine. Heart rate (HR) was recorded at a rate of 0.2 Hz with a heart rate monitor. Ambient air temperature (Tair), relative humidity (RH), and barometric pressure (Pair) were measured with a hand-held humidity sensor.

Decontamination tasks consisted of simulated decontamination procedures employed when CBIRF establishes a field decontamination line, including lifting and moving litters and washing down individuals. Reconnaissance of the surrounding area involved walking through various environments, such as buildings, building debris, open fields, and woods.

Results: The intent of this study was to quantify respiratory demand during operationally relevant tasks. According to CBIRF noncommissioned officers (NCOs) and experienced trainers, the physical tasks employed in the DECON, RECON, and CPAT events closely mirror some CBIRF operational tasks. All Day 2 trials (both DECON and RECON) lasted for the full trial duration of 60 min compared with 19.2 ± 4.1 min during Day 3. Both Day 2 and Day 3 trials included a 5-min rest period prior to exertion. Region of peak respiration (RPR) was calculated to average 2.8 ± 1.6 min for Day 3 (CPAT) trials.

Respiratory responses reflected the physical demands placed on participants. Mean inspiratory airflow increased significantly as workload increased from rest to light/moderate (DECON or RECON) exertion or rest to heavy exertion (RPR or final exercise period (FE)). Heavy workloads (RPR or FE) generated significantly greater mean inspiratory airflow than light/moderate workloads (DECON or RECON). Mean inspiratory airflow observed during peak exertion (RPR) (96.4 ± 18.9 L/min) exceeded 100 L/min in 42% of subjects and was 300% greater than the constant 32 L/min flow rate currently used in filter testing while maximum inspiratory airflow (131.7 L/min) was roughly 400% greater. Heavy exertion also increased mean breathing frequency (40.5

± 6.7 breaths/ min) and mean tidal volume (2.33 ± 0.63 L) significantly higher than values measured either during rest or light/moderate workloads. Likewise, PIF increased significantly as a function of exertion with during heavy exertion (238.7 ± 34.0 L/min) more than double that measured during light/moderate work (95.9 ± 22.6 L/min). PIF exceeded 300 L/min in nearly half of subjects during heavy exertion. Changes in respiratory timing also reflected increased exertion. Significantly longer breathing times were observed at rest than during light to moderate work. The greater exertion required during RPR and FE produced much shorter breath durations than either rest or light to moderate exertion. Inspiratory time did not change significantly when moving from rest to light/moderate exertion, but heavy exertion reduced it significantly.

Discussion: Results from this study suggest that respiratory rates currently used for filter assessment underestimate respiratory demand of individuals performing rigorous physical tasks. Mean inspiratory flow measured in this study was roughly double that used in current testing. Maximum individual mean inspiratory flow was even higher, though of short duration. Filter loading, a function of both flow (integrated over time) and contaminant concentration, will be affected by PIF if workloads sustain elevated breathing over extended time periods. For example, ascending many stairs in a large office building or removing large quantities of overhead rubble, common tasks for first responders, could induce such elevated flow rates over many breathing cycles for time periods lasting much longer than the exercise periods used in this study. These values suggest that filter loading will be much greater than currently tested when performing physically demanding tasks. PIF results suggest that air velocities through filters will also be greater during periods of high exertion.

If filter testing is to predict filter performance under respiratory demands experienced during operational conditions, then test criteria needs to be revised to better reflect physiological requirements in the field. Despite short PIF durations associated with the overall short RPR durations observed in this study, any filter breakthrough due to high PIF would likely have a cumulative effect (assuming the contaminant has a cumulative effect), even if breakthrough concentrations delivered sub-"Immediately Dangerous to Life or Health" (sub-IDLH) dosages per inhalation. Two factors are likely to contribute; elevated oxygen demands caused by cyclical episodes of heavy workloads and repeated tissue dosing should filter breakthrough occur.

Test conditions artificially constrained workloads in that subjects moved from highly demanding physical tasks (e.g., stair climb) to less demanding tasks (e.g., hose pull) in relative short time periods not exceeding 5 minutes. In contrast, workload demands in the field are often cyclical (work/rest) and concentrated on a single highly demanding physical task (e.g., moving rubble) for extended time periods. Repeated RPR-type breathing patterns would likely occur due to the oxygen demands of such hard work. Under such conditions, any filter breakthrough caused by the high PIFs observed during RPR would likely be experienced over many breaths. Also, the high breathing frequencies associated with high PIF would leave little time for effective tissue clearance between breaths.

These results, while considerably higher than current flow rates used to test filters, are generally consistent with existing literature on respiratory demand during both light to moderate and heavy exercise.

Overall, correlation with other studies suggests that the present results reflect actual respiratory demands experienced during physically demanding operational tasks. These results indicate that high minute ventilation rates approximating those seen during maximum exertion are achievable in occupational settings. In addition, peak flow rates can greatly exceed these values by more than 150 percent. Failing to account for these high flow rates could also lead to unanticipated levels of filter loading, causing increases in filter resistance or higher air stream velocities within filter beds, raising the possibility of breakthrough due to insufficient residence time. Initial results from an ongoing U.S. Army study of respirator filter breakthrough times based on the higher respiratory rates found in this study suggest this is indeed the case. This poses a challenge to respirator filter designers to address these higher-than-anticipated flow rates during both the design and testing phases of filter development and operational deployment, as shown by the recent U.S. Army testing.

This study will hopefully prove valuable to the broad industrial and military community of respirator users. It represents a first attempt at measuring respiratory demand in military personnel performing operationally relevant tasks. While CPAT tasks are relevant to the CBIRF mission, examining different military and civilian tasks with greater physical demands or longer durations would greatly add to understanding occupational respiratory demand and how to model it in the laboratory.

E. coli Infections from a U.S. Military Installation - Okinawa, Japan, February 2004

Source: "*Escherichia coli O157:H7 Infections Associated with Ground Beef from a U.S. Military Installation --- Okinawa, Japan, February 2004*", MMWR Weekly Report, January 21, 2005 / 54(02); 40-42, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5402a3.htm.

In February 2004, the Okinawa Prefectural Chubu Health Center (OCHC) and the Okinawa Prefectural Institute of Health and Environment (OIHE), Japan, investigated three cases of *Escherichia coli* O157:H7 infection in a Japanese family associated with eating ground beef. Public health officials from multiple agencies in Japan and the United States collaborated on this investigation, which resulted in a voluntary recall of approximately 90,000 pounds of frozen ground beef in the United States and at U.S. military bases in the Far East. This was the first reported instance in which Japanese public health officials identified contaminated, commercially distributed ground beef that was produced in the United States. This report summarizes epidemiologic and laboratory investigations conducted by OCHC and OIHE. The results underscore the importance of using standardized molecular subtyping methods throughout the world to facilitate international public health communication and intervention.

Cases were ascertained through surveillance for laboratory-confirmed *E. coli* O157:H7 infection. Laboratory investigation of implicated food items was conducted using

methods recommended by the Japanese Ministry of Health, including culture of food samples, immunomagnetic separation, and polymerase chain reaction to characterize isolates. Pulsed-field gel electrophoresis (PFGE) of the genomic DNA fragments of *E. coli* O157:H7 isolates was performed after restriction with *Xba*I enzyme in accordance with the PulseNet protocol by the National Institute of Infectious Diseases, Japan. PFGE patterns were analyzed and transmitted electronically to PulseNet USA at CDC for comparison with U.S. isolates.

On February 17, 2004, OCHC was notified of laboratory-confirmed *E. coli* O157:H7 infection in a hospitalized child in Okinawa. The child had been hospitalized with bloody diarrhea and, 6 days previous, had other symptoms, including abdominal pain and fever. Interviews with the child's family revealed that a sibling appeared to have some of the same symptoms. Family members were also questioned about food history; all family members had eaten hamburgers on February 6. In addition to the hospitalized child, *E. coli* O157:H7 was isolated from the symptomatic sibling and one asymptomatic family member.

The frozen ground beef patties eaten by the family were purchased from a U.S. military commissary in Okinawa. OCHC obtained the remaining frozen ground beef patties from the family and sent a sample to OIHE for laboratory evaluation; *E. coli* O157:H7 was isolated from the ground beef patties. Epidemiologic and laboratory findings were reported by the Okinawa Prefecture to the U.S. Naval Hospital in Okinawa. To exclude the possibility that the patties were contaminated after opening, the U.S. Naval Hospital obtained unopened frozen ground beef patties with the same lot number from the base commissary for microbiologic analysis; *E. coli* O157:H7 was isolated from these previously unopened ground beef patties. Isolates from the unopened package, leftover ground beef patties, and the three human isolates had indistinguishable PFGE patterns. The pattern had not been previously observed in Japan or in the PulseNet USA database.

Results of the investigations indicated that the source of infections was contaminated ground beef patties obtained from the U.S. military base in Okinawa. Traceback of the lot number indicated that the frozen patties were produced on August 11, 2003, by a U.S. company. Fresh and frozen ground beef products produced on that day were distributed to U.S. military installations in the Far East and to institutional and retail outlets in California, Idaho, Oregon, and Washington.

As a result of this investigation, the Food Safety Inspection Service of the U.S. Department of Agriculture announced a voluntary recall by the company of approximately 90,000 pounds of frozen ground beef and other ground beef products. Identification of the contaminated lot and the subsequent recall likely prevented additional infections.

Editorial Note:

E. coli O157:H7 infection is a major cause of foodborne illness in many countries, including the United States and Japan. In 1996, Japanese public health officials investigated the largest outbreak of *E. coli* O157:H7 infection, which was associated

with consumption of radish sprouts, with approximately 6,000 persons becoming ill. The outbreak described in this report demonstrates the need to eliminate *E. coli* O157:H7 contamination of ground beef and the need for consumers to follow guidelines for safe food preparation. Moreover, this outbreak demonstrates the potential for multinational foodborne outbreaks and the benefits of international public health communication and use of standardized methods of molecular subtyping for detection and prevention of foodborne diseases.

During the weeks after this investigation, three additional *E. coli* O157:H7 infections were identified as potentially associated with this outbreak, one in Japan and two in the United States. On February 27, a child aged 11 years of a U.S. military family in Okinawa was hospitalized with *E. coli* O157:H7 infection; the PFGE pattern was indistinguishable from that of the three infected persons described in this report. The family had purchased the same brand of frozen ground beef patties from the U.S. military commissary in Okinawa. The hamburgers were prepared and eaten on February 22, 2 days before the recall notice. Although the company name was the same, the lot number could not be confirmed because the family discarded the package after learning of the recall.

In the United States, two clinical *E. coli* O157:H7 isolates with the outbreak PFGE pattern were identified in a woman aged 40 years and a child aged 10 years in Orange County, California; both patients were hospitalized. Both patients had eaten beef during the week preceding their illness. Specimen collection dates were August 26, 2003, and September 8, 2003. No association with the recalled product was made, although the PFGE pattern was unique to California, and the cases were temporally related with respect to distribution of the recalled products to institutional and retail establishments in California. The 6-month lag between production in the United States and sale in Japan, with intervening cases in the United States, demonstrates the long life of products such as frozen ground meat and the prolonged survival of foodborne pathogens in frozen foods. This investigation also highlights the ability of PulseNet USA to identify small clusters of indistinguishable isolates and the potential for prevention, particularly if epidemiologic links can be made between ill persons and food items in a timely and coordinated manner.

The use of standardized protocols for molecular subtyping during international outbreaks of foodborne disease and the ability to communicate with international public health authorities have been important in previous outbreaks. The development of PulseNet USA has had an important impact on the investigation of foodborne outbreaks and public health in the United States. PFGE was used to characterize food and clinical isolates after a large outbreak of *E. coli* O157:H7 infections in 1993. Subsequently, CDC standardized PFGE protocols, disseminated them to state and local public health partners, and began building the PulseNet USA network.

Use of the PulseNet USA protocols during the public health investigation by Japan led to an international recall of contaminated ground beef and enabled international comparison of isolates facilitating detection of presumptively associated *E. coli* O157:H7 infections in the United States. In collaboration with many partners, CDC has facilitated

establishment of PulseNet International, which has launched networks in several regions of the world. The continued development of PulseNet International will enhance international collaboration in the investigation of foodborne diseases and outbreaks.

OTHER ITEMS OF INTEREST

Keys to a Successful Protective Eyewear Program

Citation: *"Don't lose sight of eye safety",* by Bob Brown, Industrial Safety and Hygiene News, January 2005.

While the good news is that eye-related injuries can be reduced and/or eliminated, the bad news is that they're not always an easy fix. Ensuring that employees wear the correct eye protection for the task requires an effective protective eyewear program.

On the Attack

If eye injuries are occurring at your company, attack the problem by doing hazard assessments in the areas where the injuries are happening. Also, ensure that eye safety is a part of all hazard assessments.

To make the assessment, identify what hazards are present in your work areas. Hazards may include:

- metal chips, saw dust;
- the handling of hazardous liquids such as paint or acids;
- lights from welding or burning;
- flying debris from moving machinery or as simple as a carpenter's nail flying back toward the face;
- bloodborne pathogen hazards.

Decision Tme

After the hazard assessment, it's time to decide what level of eye protection is needed. A variety of protection is available, including:

Sideshield safety glasses — The variety of glasses is unbelievable. They are offered in various styles and prices. They must meet ANSI Standard Z87.1.

Goggles — These are used for chemical splash and impact resistance. Models are also available with a form-fitting material around the goggles that gives extra protection. For chemical protection, indirect vents are needed. Direct-vented goggles are used for protection against flying debris only.

Face shields — Use of a face shield must be accompanied by safety glasses or goggles worn under the shield. The face shield itself is not eye protection, but it does add protection from flying debris that could fall behind a pair of safety glasses.

Welding hoods — These are used to protect eyes from bright light, heat, ultraviolet light and flying sparks. Filter lens requirements can be found in OSHA CFR 29 1910.133 Eye and Face Protection.

Prescription safety glasses — Although a lot of safety eyewear fits over personal eyeglasses, prescription safety glasses provide a better option. Companies can work with local eyewear distributors and implement programs to enable employees to purchase prescription safety glasses. Prescription inserts can also be purchased for goggles and respirator facemasks.

Get Specific

Wearing safety glasses in the workplace has become more and more commonplace, but there are still plenty of challenges in the area of eye protection.

One reason employees don't comply is because they don't think safety glasses are needed. It's hard to enforce the wearing of safety glasses in general work areas because although safety glasses may be required for an entire manufacturing plant floor, there could be areas where hazards are minimal and employees become lax.

It's different for a face shield or goggles, which have identified tasks for which they are required. For example, a face shield might be required when using a grinder or a saw. But for general tasks, employees become complacent when it comes to safety glasses.

When the eye protection rules are general - required in the entire building - employees will be tempted to remove their glasses when they think the risk is minimal.

Other pitfalls that can result in a poor protective eyewear program include:

- not enforcing written rules;
- not enforcing the rules for everyone (including visitors and management);
- lack of eyeglass cleaning stations.

Start Immediately

Eye injuries can be avoided. Injury data states that nearly 60 percent of eye injuries happen to workers not wearing eye protection. Workers wearing safety glasses without side shields are also at a higher risk. Flying particles cause the majority of eye injuries, and 20 percent of the injuries are due to chemical splashes.

To start reducing eye injuries immediately:

- Review past eye injuries and identify the causes.
- Do a hazard assessment in the areas where the injuries are occurring.
- Identify the needed level of eye protection.
- Roll out the new safety efforts with training sessions on the eye protection and where it will be utilized.

Why Workers Shirk Using Face Shields & Goggles

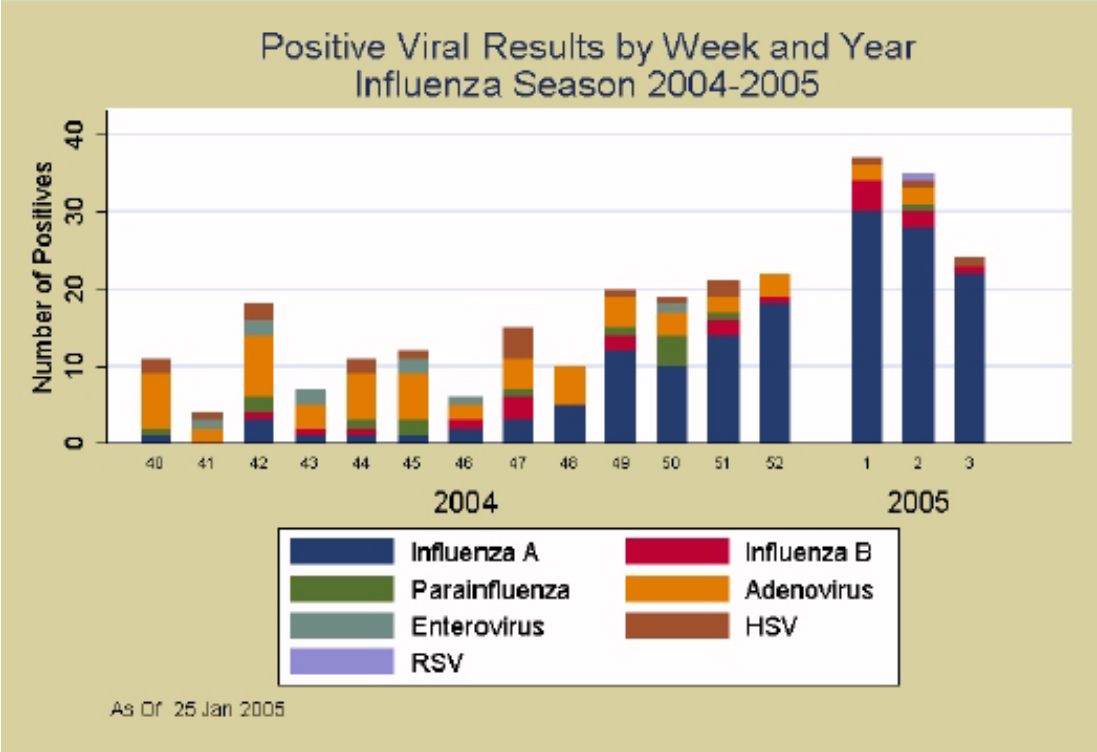
Utilizing face shields and goggles in high-risk tasks can reduce injuries. When using equipment that is capable of propelling objects into the air and when chemical splashes may occur, a face shield or goggle is the best protection.

Despite the protection face shields and goggles provide, why don't employees use them when they are needed and/or required?

1) Availability — Have a face shield or goggles hanging at the saw or grinder so that they're easy to access. If a worker needs a face shield but cannot easily find one he will often do the task without wearing the correct protection.
2) Condition — Having dirty or scratched face shields and goggles often results in the same at-risk behavior. If the work area is prone to dirt build-up, keep the face shield or goggles under a cover at the workstation. Make sure that replacement lenses are easily obtainable.
3) Enforcement — If management does not enforce the rule of using a face shield the employee will oftentimes feel that his safety glasses are sufficient protection. Make sure that supervision is enforcing the face shield rules. Your program should be audited on a regular basis by the safety person going to the area and visibly ensuring that face shields are being worn. NOTE: Always wear safety glasses under a face shield.

Influenza Update - DOD Worldwide Influenza Surveillance Program

This graph plots the percentage of weekly outpatient visits at military installations that had an ICD-9 code correlating with Influenza-Like Illness as defined by Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) for Week Ending 22 January 2005. Since 3 October 2004, the Epidemiological Surveillance Division (AFIOH/SDE) has processed 987 specimens as part of the influenza surveillance program. Of those specimens, 151 (15%) were positive for influenza A and 19 (2%) were positive for influenza B. In addition, 94 specimens are still being processed.



View the AFIOH details at https://afioh.brooks.af.mil/pestilence/Influenza/ (Access from ".mil" domains only). (CHPPM HIO Weekly Update – February 4, 2005)

Report May Lead to Changes to Water Contamination Limits

The Desert Sun reported that the tolerable level of rocket fuel in drinking water could be higher than health officials once thought. A report by the National Academy of Sciences indicates that safe levels of the chemical perchlorate could be 20 times higher than the Environmental Protection Agency has suggested in the past. The study is expected to influence state and federal regulators as they craft federal standards. Environmental and public interest groups were quick to criticize the research they said was unduly influenced by perchlorate producers and the military. Much of the debate over the chemical has centered over how much exposure it takes to impair thyroid function in humans, something that can be especially important to pregnant women and infants. (CHPPM HIO Weekly Update – January 14, 2005)

Characteristics of Effective Online Learning

Citation: *"Characteristics of Effective Online Learning",* by Donald A. Deieso, Occupational Health and Safety, January 2005.

During the past decade, "e-learning" has become a familiar term and a routine part of many corporate training programs. Most typically, it has referred to the use of computer-aided technology, either via the Internet or in stand-alone modules, that provides standardized information to employees. By allowing virtual learning, the technology has enabled many organizations, from the U.S. Food and Drug

Administration to IBM, to provide far-ranging training programs to a dispersed audience.

The e-learning experiences of the 1990s and early 2000s have evolved into a more comprehensive understanding about what makes a workforce training initiative effective and how online learning can be integrated into that initiative for maximum advantage. Leo McKnight, director of Training for Hilti North America (manufacturers of power hand tools and fastening systems for contractors), is intimately familiar with the changing face of online learning and explains how it has changed. "Training is an investment in a company's future," he says. "It's an investment in its employees and, basically, those employees are a company's future. The point isn't just to dump information on people; it's to give people the skills they need to do their jobs and to advance in their fields. Online learning can play a real role in that effort if it's done right."

Training for More Than Compliance

Safety training has traditionally been based on the requirements of regulatory compliance. Certainly, the ability to comply with increasingly complex regulatory requirements is of critical importance to any organization. Beyond simple compliance, safety is, in fact, a key factor in most companies' standard operating principles. In addition to the obvious impact on the injured worker, few companies would dispute the detrimental impacts on their operations, performance, and workforce of on-the-job injuries and accidents.

Statistics show that a regulation-based approach worked for many companies. Increasingly, however, companies are embracing a new framework of "doing it right" that focuses on empowering their workforces to meet the growing challenges of a "knowledge economy."

Several different factors play into the interest of firms that are trading in their "training" approach for a "learning" focus. Perhaps most immediately, professional development in its broadest sense has emerged as a key recruiting and retention tool. For those companies, keeping the best employees means giving those workers a path upward - and that means providing them with the knowledge they need, not just to stay safe on the job but to progress in their careers. For these companies, compliance has become a means to an end, not the end itself. For them, "the end" is improved business performance; a safer, more stable workforce; and a substantially improved risk management.

A second concern of many companies is the upcoming loss of seasoned employees as the Baby Boom generation prepares for retirement. Transferring knowledge from these longtime employees, whether they represent senior management personnel or on-the-line production workers, is likely to be a challenge for any organization. Meeting that challenge, however, is not a choice, but a requirement for organizations determined to grow and prosper.

And a third concern is recognizing that, apart from mandatory annual safety training, every employee needs to learn a specific set of information important for a particular purpose and does not want to spend time "relearning" what has already been learned.

An Effective Workforce

Not so long ago, building an effective workforce meant delivering a standard set of instruction in a standardized format and on an established schedule to workers. Today, building and maintaining an effective workforce capable of responding to the challenges of today's workplace demands providing the right knowledge at the right time to the right people. It means getting away from providing a pre-set program of instructor-based or online learning and creating a "competency-based learning culture."

"The point no longer centers on how much training a company provides, but how well the necessary knowledge is delivered, learned, and applied in the work environment," notes Dr. Karl Kapp, an acknowledged learning expert from Bloomsburg University. "And, critically, that applies just as much to managers as it does to production employees."

Every safety manager has laughed about the one-size-fits-all online course that provides heat-stress information to workers in Ontario or explains the impact of extreme low temperatures on industrial processes to workers in Miami. Safety managers have seen the inherent problems when all training is focused only on production workers, leaving a knowledge gap among the managers charged with implementing or designing safety initiatives. And new hires have a special need to learn about site- and company-specific policies and procedures.

Beyond Safety: A Successful Learning Culture

Although each company has its own standard operating procedures, its own unique culture, and its own vision of the future, virtually all successful companies share a pragmatic need to increase quality and productivity. It is in this area particularly that online learning has evolved. To be effective today, a program must adopt a three-tiered strategy that acknowledges the role of the organization itself, management, and the individual worker. Each group has its own stake in the efficiency and effectiveness of the strategy - and each group has its own needs.

- *Start from the beginning; get support from the top*. It seems self-evident, but training is effective only when it is supported from the top. In organizations where learning is treated as a costly "add-on" to the more "important" business of running the company, the learning solution will fail. A substantial commitment to professional development and quality indicates to employees the company cares about their safety, well-being, and performance. It confirms the company wants its employees to succeed, and typically it is rewarded by employee loyalty, productivity, and performance.
- *Assess the organization*. The point of an online learning program today is to enable employees to contribute to the company's identified business objectives and goals. To do that, the company must have a clear understanding of its short- and long-

term objectives and how a workplace knowledge solution can help it achieve those goals. For example, a company committed to a five-year business strategy of rapid growth will recognize the need for extensive new-hire learning systems. Questions a company must answer range from its expansion strategy to the anticipated mix of its products and services, planned new product introductions, anticipated retirement of employees, and recruitment plans.

- *Assess the learners*. Each learner brings his or her own levels of knowledge, confidence, and concern to the learning table - whether the learner is a senior manager or a new hire for the factory floor. Effectively determining what knowledge any individual needs may be one of the most substantial challenges for any initiative, and online learning is no exception. It is a critical requirement of an effective system. Where are the gaps, what does the learner know, what does he or she need to know? These questions must be answered before an effective program can be developed and delivered.
- *Measure, measure, measure*. If it can't be measured, it can't be monitored. And more to the point, if it can't be measured, it can't be modified, improved, upgraded, or expanded. The reason to provide a knowledge system is to enable employees to learn valuable skills, information, processes, and procedures that ultimately change behavior in a way that promotes the larger business objectives. For that to happen, it is imperative that systems be developed to track not only which employees have learned new skills or knowledge, but how it is applied. Measurement is especially important during times of tight budgets, when there is no room for error and any management initiative must be cost-justified.
- *Provide the justification*. Just as managers must provide program justification to their senior managers, they also must communicate the "why" of the programs to their workers. For the programs to be effective, employees should understand that the learning initiative is a means for them to improve their value to the company and, ultimately, to themselves.
- *Involve the line managers*. Any learning program should involve the direct supervisors of the learners, not just senior managers or safety directors. In many organizations, that individual will be the line manager, whose active involvement reinforces the importance of the learning program as a key component of workplace performance, not simply an added-on safety requirement.
- *Involve the learners*. It is a rare company that does not give lip service to the value of its employees, yet some firms do not follow through with that sentiment. Most employees will demonstrate remarkable involvement and loyalty when they understand the role they play in their company's performance - when, in effect, they are empowered to be part of the company's success. As companies around the world are learning, an empowered workforce can be the difference between innovation and stagnancy, success and failure. An online, competency-based format is an ideal opportunity for companies to promote that empowerment by showing

their employees how they fit into the whole and how they can progress in the organization.

Learning for Success

Knowledge and the transfer of knowledge is part of a long-term business strategy that includes quality, compliance, and performance management. A definition of "effective" in today's online culture includes methods that recognize a learner's needs, teach to those needs, manage the information, and transfer the knowledge gained.

An initial investment in time and talent will result in a program that effectively meets business objectives and develops employees - the real goal of any learning activity.

Canada Reports Third BSE Case

CIDRAP News reported that Canada reported its third confirmed case of bovine spongiform encephalopathy (BSE), just 9 days after confirming its second case. The case was in an Alberta beef cow just under 7 years old, the Canadian Food Inspection Agency (CFIA) said. "No part of the animal has entered the human food or animal feed systems," the agency said. Investigators have identified the cow's birthplace and determined that it was born in March 1998 - after Canada imposed its 1997 ban on the feeding of ruminant animal protein to ruminants. "Based on preliminary information, feed produced prior to the introduction of the 1997 feed ban in Canada remains the most likely source of infection in this animal," the CFIA said. All three of Canada's BSE cases have occurred in Alberta. The first was discovered in May 2003, and the second was confirmed on January 2 of this year. The latter involved an 8-year-old dairy cow from a farm northwest of Edmonton. The CFIA said the investigation of the latest case is independent of the probe into the second case. View the CIDRAP details at http://www.cidrap.umn.edu/cidrap/content/other/bse/news/jan1105bse.html. (CHPPM HIO Weekly Update – January 14, 2005)

Hepatitis Outbreak Warning

The New York Daily News reported that Sen. Chuck Schumer is pushing for more resources to fight hepatitis C warning that could become "the AIDS of the 21st century." Suffolk County has recorded about 7,000 cases of hepatitis C, while 4,365 cases have been reported in Nassau, health officials said. But the number of people who may be infected and not know it could be much higher, said Dr. David Ackman, Nassau County's health commissioner. About 4 million Americans have been infected by the virus at least once, and close to 3 million are chronically infected, according to the Mayo Clinic. The virus can be controlled with early detection, but there is no vaccine to prevent it. Experts still don't fully understand how hepatitis C is transmitted. But the Centers for Disease Control estimate that 60% of new cases are caused by needles shared by intravenous drug users. View the New York Daily News details at http://www.nydailynews.com/boroughs/story/272575p-233397c.html. (CHPPM HIO Weekly Update – January 28, 2005)

Indian Ocean Earthquake & Tsunami Emergency Update

The Pacific Disaster Management Information Network reported that search and rescue operations for the 26 December tsunamis are largely over. The focus is relief, recovery and rehabilitation. The death toll is now over 280,000 people along the coastal areas of 11 countries in the Indian Ocean. Tsunami-related deaths have been reported in Sri Lanka, India, Indonesia, Thailand, Malaysia, Myanmar, Maldives, Bangladesh, Somalia, Tanzania and Kenya. The loss of life is particularly severe in Indonesia, Sri Lanka, India and Thailand. The death toll in Indonesia's northern province of Aceh on the island of Sumatra, which was close to the epicenter of the earthquake, climbed to more than 228,000, with tens of thousands people still unaccounted for. WHO estimates 80 percent of Aceh's west coast was damaged. The death toll in Sri Lanka climbed to 38,000 and is expected to go higher. In India at least 10,672 died. India's Andaman and Nicobar Islands, and the southern state of Tamil Nadu were the worst hit areas. The death toll on Thailand's west coast, including the resort islands of Phuket and Phi Phi, climbed to over 5,300, including some 1,765 foreigners from at least 36 countries. The world's largest reinsurer, Munich Re, estimates the total cost of the disaster will exceed US$13.6 billion. View the PDMIN details at http://www.coe-dmha.org/Tsunami/Tsu012505.htm. (CHPPM HIO Weekly Update – January 28, 2005)

Cholera Outbreak among Refugees

The Weekend Australian reported that cholera has struck in Aceh due to the unsanitary conditions left by the tsunami devastation, according to the Islamic relief organization Mer-C, which has teams of medics working in the worst-hit towns of Banda Aceh and Meulaboh. Twenty cholera cases were being treated in a refugee camp in Nagan Raya, in the Meulaboh area, said Mer-C official Jose Rizal Jurnalis. Two of the cases were serious, with the patients severely dehydrated from constant diarrhea, Dr. Jurnalis said. One 12-year-old child had contracted the disease, while the other cases were adults. World Health Organization (WHO) epidemiologist Tom Grein said he had yet to document any cases of cholera, although there had been cases of severe diarrhea along the west coast, where Mer-C claimed to have found the disease. "We are very concerned," Dr. Grein said. "Cholera is high on our radar screen." If the patients were

in proper care, he said, cholera was only fatal in about 1 per cent of cases, with dehydration the most serious problem. However, providing proper healthcare for the hundreds of thousands of homeless Acehnese has been proving difficult, with some districts still only reachable by helicopter.

Dr. Grein said that of the communicable diseases, the WHO was most concerned about diarrhea-type diseases including cholera, as well as measles, malaria and tetanus. The Acehnese had a low immunization rate, and cases of measles had already been documented. Malaria was of particular concern because the pools of stagnant water left by the tsunami had led to a dramatic increase in mosquitoes. The WHO had already documented 59 cases of tetanus. Tetanus, or lock-jaw, is a bacterial disease that affects the central nervous system and kills in as many as a quarter of cases. The disease has been contracted by people cut and wounded as they searched through rubble and sharp debris in search of their belongings, Dr Grein said. View the Weekend Australian details at http://www.theaustralian.news.com.au/common/story_page/0,5744,11960567%5E2703,00.html. (CHPPM HIO Weekly Update – January 21, 2005)

Nighttime Splinting May Help Carpal Tunnel

Citation: "*Nighttime Splinting May Help Carpal Tunnel*," by J. Croasmun, *Ergoweb*, January 2005, http://www.ergoweb.com/news/detail.cfm?id=1043.

A new study by the University of Michigan Health System finds that workers in the early stages of carpal tunnel syndrome (CTS) may find relief through nighttime splinting. The study, performed in conjunction with the VA Ann Arbor Healthcare System, looked at 112 active workers at a Midwestern automotive assembly plant; the industry was chosen specifically because automotive assembly workers are five- to 10-times more likely to develop CTS than the general population. Each worker in the study had reported symptoms of CTS but none had sought medical treatment.

Sixty-three participants were fitted with a custom wrist-hand splint that kept the wrist in a neutral position overnight, and were instructed to wear the splint at night for six weeks. All 112 participants watched a 20-minute video at the start of the study that explained CTS and how to reduce CTS stressors in and out of the workplace.

After six weeks, approximately half of the splinted group reported a significant improvement in their symptoms and reported a decrease in hand, wrist, elbow and forearm discomfort over the non-splinted group. Participants who reported the highest levels of discomfort at the onset of the study reported the greatest improvements associated with splint use.

According to the study's lead author, Robert A. Werner, M.D., professor in the Department of Physical Medicine and Rehabilitation at the University of Michigan Health System, custom fit or store-bought splints for night-time use are the best first-line of defense for early symptoms of CTS, but have minimal effect for people with advanced CTS. Additionally, Werner cautioned against splinting during active day-time use because of the additional strain it can cause on the wrist.

Research Looks at the Impact of Long Work Shifts on Driving

Citation: "*Are Long Shifts Dangerous For Drivers?*," by J. Croasmun, *Ergoweb*, January 2005.

Truck drivers and operators as well as law enforcement officials and safety advocates will have the next 45 days to help the U.S. Department of Transportation's Federal Motor Carrier Safety Administration (FMCSA) determine whether or not the 2003 Hours of Service rule for truck drivers is safe and whether the rule has affected drivers' health and carrier operations.

The rule came under fire last year when a United States appeals court overturned it in July on the grounds that the FMCSA failed to consider the rule's impact on "the physical condition of the operators." Later in 2004, the FMCSA announced it would perform its own review and invite comments from interested parties to determine what changes could be made to the rule, including ergonomics, to help protect truck drivers' health and the safety of other drivers.

Study: Uncalculated Risks in Some Pesticides

University of California, Riverside researchers have demonstrated that mirror-image molecules, known as enantiomers, of some pesticides have very different biological and environmental impacts between the two sides. This finding may have significant implications for risk assessment and development directions of new products.

According to Jay Gan, a UCR professor of environmental chemistry, the environmental risks of pesticides have been traditionally evaluated on the basis of their specific chemical structure. He found, however, that chiral pesticides, which include many widely used organophosphates and synthetic pyrethroids, pose previously uncalculated toxic risks due to the differing biological reactions of the isomers in the environment.

Chiral compounds occur as isomers with two (or more) identical but mirror-image structures. Gan's research indicates that, while these structures are chemically identical, they may behave differently biologically. About 25 percent of pesticides fall into this classification and their proportion is expected to increase as new products are being introduced into the market.

Gan's findings support the argument that regulators should consider whether a product is a chiral compound when assessing its risk. The findings may also indicate that the chemical industry should pursue the value of producing single isomer products instead of mixed isomer products. By using pesticides that contain only the active isomer, farmers would be likely to achieve the same degree of pest control with a reduced level of application. This reduced use of pesticides would likely have environmental benefits.

These findings were published in a paper titled *Enantioselectivity in Environmental Safety of Current Chiral Insecticides* in the online edition of the *Proceedings of the National Academy of Sciences*. Gan published the paper in cooperation with a team of UCR colleagues including Daniel Schlenk, professor of aquatic ecotoxicology; Soil Physics Professor, William A. Jury; and visiting professor Weiping Liu.

INTERNET NEWS

OSHA Web Page Highlights Noise and Hearing Conservation

OSHA recently added a new electronic assistance tool on its website to highlight the prevention of occupational hearing loss. The *Noise and Hearing Conservation eTool* features information on potential health effects of occupational noise, and provides guidance on evaluating noise exposure, while presenting examples of functional hearing conservation programs. The eTool also provides references and resources on OSHA's standards and requirements related to the issue. The eTool is a joint product of OSHA's Alliance with the National Hearing Conservation Association. The web site also references OSHA noise exposure standards and employer responsibilities. OSHA requires employers to determine if workers are exposed to excessive noise in the workplace. If so, the employers must implement feasible engineering or administrative controls to eliminate or reduce hazardous levels of noise. Where controls are not sufficient, employers must implement an effective hearing conservation program. The eTool is on OSHA's web site at http://www.osha.gov/dts/osta/otm/noise/.

NIOSH Adds Aerosols Topics Pages

These pages provides links to a variety of information regarding the measurement, control, exposure characterization and health effects associated with aerosols in the workplace. The definition of an aerosol, as used here, is a suspension of tiny particles or droplets in the air, such as dusts, mists, or fumes. These particles may be inhaled or absorbed by the skin, and can sometimes cause adverse heath effects for workers. Infectious aerosols are dispersions of airborne liquid or solid particles capable of causing infection. NIOSH has carried out extensive research to minimize the adverse health effects associated with aerosol exposures. Find the new aerosols and infectious aerosols pages at http://www.cdc.gov/niosh/topics/aerosols/ and http://www.cdc.gov/niosh/topics/infectaero/, respectively

National Toxicology Program Issues Eleventh Edition Report on Carcinogens

On January 31, 2005, the Department of Health and Human Services, National Toxicology Program, released the Eleventh Edition of its Report on Carcinogens. The report can be accessed from the following web site http://ntp.niehs.nih.gov (Select the Report on Carcinogens).

PROFESSIONAL NEWS

ACGIH Board Ratifies 2005 TLVs AND BEIs

The ACGIH® Board of Directors ratified the 2005 Threshold Limit Values (TLVs®) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs®). The Board also approved recommendations for additions to the Notice of Intended Changes (NIC). A listing of the substances that were acted upon is available at http://www.acgih.org/tlv/NIClist.htm.

The Annual Reports of the ratifications of the ACGIH Board will be published in the winter issue of the ACGIH newsletter Today! Online, and can be found online at http://www.acgih.org/Store/ProductDetail.cfm?id=1769. ACGIH members can download the electronic version of the Annual Reports at no cost. Non-members may purchase the report through the ACGIH.

Draft documentation for the substances on the NIC are currently available for purchase at www.acgih.org/store. Documentation for the adopted substances and agents will be available after February 9, 2005. All Documentation are in ".PDF" format. ACGIH members are entitled to five free Documentation downloads per year. The 2005 TLVs & BEIs book and the 2005 Guide to Occupational Exposure Values will be available soon.

This notice provides not only an opportunity for comment on these proposals, but it also solicits suggestions for substances to be considered for TLVs, such as those found on the current list of "Chemical Substances and Other Issues Under Study." Comments or suggestions should be accompanied by substantiating evidence in the form of peer-reviewed literature and forwarded, preferably in electronic format, to The Science Group, ACGIH (science@acgih.org). Please refer to the ACGIH TLV/BEI Development Process on the ACGIH website (http://www.acgih.org/TLV/DevProcess.htm) for a detailed discussion covering this procedure and methods of input to ACGIH.

ACGIH recommends that all TLV and BEI users read the Statement of Position Regarding the TLVs and BEIs which outlines the proper usage of TLVs and BEIs. The Statement of Position can be found in the TLV/BEI Resources section of the ACGIH website (http://www.acgih.org/TLV/). In addition to the Statement of Position, visitors to this site will find other useful information on TLVs and BEIs.

ABIH News

The ABIH Board elected three new Directors at their last Board meeting. Kent Candee, CIH, of Des Moines, IA; Lisa Quiggle, CAIH, of East Lansing, MI; and S. Ford Rowan, of Washington DC, will take office at the conclusion of the March 2005 Board meeting. Mr. Rowan is joining as the "public member" on the Board to represent the general public on the board and provide an outside perspective to the Board's deliberations. Ms. Quiggle becomes the first person with the Certified Associate Industrial Hygienist credential to serve on the Board.

Also, Ron Drafta joins the Board staff as the Certification Program Manager. His role primarily deals with the examination process, including serving as the Board's liaison with its testing services and includes maintaining a current question bank, updating the exams, and working with the Exam Committee.

Recent ABIH Bylaws changes will reduce the Director term of office from six years to four. The size of the Board will also drop from its current nineteen Directors to eleven by the beginning of 2007. The eleven includes ten Diplomates and one Public Member who will be elected for a two year term and may serve a total of two terms. In order to balance those retiring from the Board with those being elected, ABIH will alternately elect two and then three Diplomates each year. The slate of candidates comes from Diplomates who self nominate. The current Bylaws are available on the General Information page of the ABIH website (http://www.abih.org/).

The ABIH Board meeting schedule for 2005 is:

- March 5-6 in Atlanta
- May 22 at the Anaheim AIHce
- October 22-23 at the Denver PCIH

Anyone with issues that need to be addressed by the Board should contact the Executive Director, Lynn O'Donnell, CIH at (517) 321-2638 or abih@abih.org.

ASSE Comments on the Proposed Standard for Hexavalent Chromium

The American Society of Safety Engineers (ASSE) provided written comments on the proposed Occupational Safety and Health Administration (OSHA) amendment its existing standard for employee exposure to hexavalent chromium [Cr(VI)]. Although ASSE commended OSHA for "its thoughtful and considerable work" in updating the standard using "a performance-based approach," their letter stated that ASSE "does not believe that enough scientific evidence exists at this time to support the 8-hour time-weighted average permissible exposure limit of one microgram of Cr(VI) per cubic meter of air" (1 $\mu g/m^3$) "for all Cr(VI)."

ASSE agreed that Cr(VI) "is a risk to employees at the current permissible exposure limit (PEL)", and that "our members fully agree a new, more stringent standard is needed, they believe additional research is needed before this or any specific standard can be supported."

ASSE supported "establishing sophisticated engineering and work practice controls, ensuring proper provision and use of personal protective equipment (PPE), managing hazards communication, extensive recordkeeping and appropriate training." They called for "the oversight of an SH+E professional with appropriate experience and education" and suggested that such oversight be done by a Certified Safety Professional (CSP), a Certified Industrial Hygienist (CIH), or a Certified Hazardous Materials Manager (CHMM).

The comments regarding the proposal for the construction industry were that it "has no teeth and therefore will not benefit [the construction] industry." The comments stated

that the standard for the construction industry "should have the same medical testing, exposure monitoring and training requirements as the general industry standard." ASSE urged that "every effort be made to make the provisions for construction as thorough in the protections it offers as for general industry."

ASSE expressed concern that OSHA had overlooked the need to address exposure risks from water-soluble hexavalent chromium. "Medical surveillance procedures exist to help protect workers from water soluble Hex Chrome, and this standard should require employers to incorporate biological exposure monitoring for workers exposed to water-soluble Hex Chrome more than 30-days a year."

ASSE restated its position that "in nearly all cases employers have the responsibility to ensure proper employee use of PPE, except where such protective clothing is considered by through the consensus of a specific industry as true tools of a trade, taken from one short-term job to another." Their letter stated that the health risks for Cr(IV) require that employers provide protective clothing and equipment, including the cleaning and disposal of PPE and to "ensure employees return all [PPE] and provide change rooms with separate storage facilities for street and for work clothing to prevent contamination outside the workplace."

ASSE commended OSHA for including thorough and appropriate training requirements throughout the standard. They added that "training could very well be the most important element in ensuring successful management of safety and health risks on a job site. Easily overlooked are ways to ensure the quality of training." They touted the American National Standards Institute (ANSI) Z490.1 Standard, "Criteria for Accepted Practices in Safety, Health, and Environmental Training" to provide a method to make sure the quality of training remains adequate.

More information about the ASSE position can be found at http://www.asse.org.

JUST THE FACTS

ISHN White Paper 2005 Survey Results

The Industrial Safety and Hygiene News has released its White Paper 2005 survey results covering: staffing, budgets, cultures, careers, tools, salaries. Here are some of the responses of the 152 full-time safety professionals and 42 industrial hygienists:

Safety Professionals' Responses		Industrial Hygienists' Responses	
What drives investments?			
Factors driving EHS spending:			
1	Compliance (67%)	1	Compliance (63%)
2	Organization values (57%)	2	EHS business benefits (40%)
3	Workers' comp (46%)	3	Organization values (38%)

			Workers' comp (38%)
Hard sells			
Your toughest sales job:			
1	Behavior-based safety (35%)	1	Incentives (39%)
2	Engineering controls (24%)	2	Ergonomics (33%)
Culture cracks			
Where does your culture need improving?			
1	Accountability (71%)	1	Accountability (51%)
2	Employee ownership (60%)	2	Management leadership (46%)
3	Management leadership (50%)	3	Communication (33%)
			Operating Procedures (33%)
Top tools			
Critical programs to reduce injuries:			
1	Use of PPE (82%)	1	Use of PPE (78%)
2	OSHA compliance (77%)	2	OSHA compliance (68%)
	Delegating EHS tasks to workers (77%)	3	Ergonomics (53%)
3	Ergonomics (58%)		Delegating EHS tasks to workers (53%)
Current salary			
$59,974		$75,807	

View the report on the ISHN web site at http://www.ishn.com/FILES/HTML/PDF/0105WPsurvey.pdf.

Aerotech IAQ Facts

IH Fact

- Styrene, an oily, colorless liquid with a sweet, floral smell, is used in the production of a number of items including plastics, resins, paints, rubber, pipes, fiberglass insulation, and Styrofoam. Although mostly a man-made chemical, styrene is also found naturally in petroleum as well as an assortment of foods, and it can be produced in smoke as a by product of combustion. According to the EPA, primary exposure to styrene occurs from contaminated indoor air, which can often be attributed to building materials, tobacco smoke, and other consumer products. Occupational exposure to styrene may also occur in the polystyrene production industry, including the manufacture of almost all plastic toys. Acute health effects to

styrene exposure can include severe eye and mucous membrane irritation and respiratory and gastrointestinal effects. Chronic exposure may cause central nervous system (CNS) depression, headaches, weakness, fatigue, depression, memory loss, reduction in reaction times, as well as hearing loss, and minor effects on kidneys and blood. According to the International Agency for Research on Cancer (IARC), styrene is classified as a Group 2B, or possible carcinogen to humans.

This information provided from the Aerotech Laboratories' IAQ Tech Tip Program, a free program distributed by Aerotech Laboratories, Inc. To subscribe, go to http://www.aerotechlabs.com/ or send a message to info@aerotechlabs.com with the subject "Add IAQ Tech Tips". See http://www.aerotechlabs.com/Infobase/techtip.aspx?CatID=1&ID=126 for references on this material.

PUBLICATIONS

Handling Bodies After Disasters

The Pan American Health Organization (PAHO) has published a new manual that dispels myths about the handling and the effects of mass casualties following a natural disaster, such as the 26 December earthquake and tsunami in South Asia. The book, Management of Dead Bodies in Disaster Situations, provides the technical information needed to support relief workers in the proper management of dead bodies, based on the following principles:

1) When a death is the result of a disaster, the body does not pose a major public health risk for the spread of infection.
2) Victims should not be buried in common graves.
3) Mass cremation of bodies should not take place when this goes against the cultural and religious norms of the population.
4) Every effort should be made to identify bodies, and - as a last resort - unidentified corpses should be buried in such a way as to permit later identification or exhumation. This is a basic human right of surviving family members.

View the PAHO publication details at http://www.paho.org/English/DD/PIN/pr050104.htm. (CHPPM HIO Weekly Update – January 7, 2005)

Updated: Histoplasmosis-Protecting Workers at Risk

NIOSH released this booklet (DHHS [NIOSH] Publication No. 2005-109) as a revised edition of the NIOSH document *Histoplasmosis: Protecting Workers at Risk*, which was originally published in September 1997. The updated information will help readers understand what histoplasmosis is, recognize activities that may expose workers to the disease-causing fungus *Histoplasma capsulatum*, and identify methods to protect

themselves and others from exposure. The booklet will serve as a guide for safety and health professionals, environmental consultants, supervisors, and others responsible for the safety and health of those working near material contaminated with *H. capsulatum*. Also included are both an English and Spanish language fact sheet intended to help educate workers and the general public about this disease. The booklet and fact sheets are available at http://www.cdc.gov/niosh/docs/2005-109.

OSHA Recordkeeping Handbook Available Online

OSHA has a new publication on its website to aid employers and workers in understanding the agency's recordkeeping policies, procedures and requirements. The *OSHA Recordkeeping Handbook* combines information from the agency's recordkeeping rule, the recordkeeping policies and procedures manual, as well as tools and guidance materials from throughout the agency's web site. The handbook allows the user to easily locate specific information pertaining to each section of the rule, and also contains recordkeeping-related Frequently Asked Questions and OSHA's enforcement guidance that has previously been presented in various agency Letters of Interpretation. Find the Handbook at http://www.osha.gov/pls/publications/pubindex.list

OSHA Offers New Worker Safety Series Guides

OSHA produced two new publications in its Worker Safety Series highlighting concrete manufacturing and warehousing. These "Pocket Guides" discuss potential hazards and solutions to keep workers safe. You can download the documents from the OSHA web site at http://www.osha.gov/Publications/3221_Concrete.pdf and http://www.osha.gov/Publications/3220_Warehouse.pdf.

Also, a new OSHA safety information pocket card, *Safety in Excavations or Trenches*, will help workers and employers understand safe trenching practices and the federal requirements for construction excavation safety. The cards are printed in English on one side and Spanish on the other. They can be found at http://www.osha.gov/Publications/trench/trench_safety_tips_card.pdf.

ASSE Offers Key Hazardous Materials Safety Information

The American Society of Safety Engineers' (ASSE) free brochure titled 'Hazardous Materials Safety Information Guide' provides key information aimed at educating the public on hazardous materials (hazmats) – what they are, who to call in an emergency, how local emergency planning committees work, and much more aimed at increasing safety.

Of the more than 3.1 billion tons of hazmats transported throughout the U.S. in 2000, there were 17,514 hazmat incidents resulting in 13 fatalities, 246 injuries and causing $72,727,595 in damages. Ohio had the most incidents, with Texas second and California third. To provide vital information on hazmats to the public in light of an expected increase in the transport of hazmats, currently at 800,000 shipments per day, and with the increased threat of terrorism, ASSE developed the 'Hazardous Materials Safety Information Guide.'

Brochure topics include: what hazmats are and what hazmat placards mean; training guidelines; how to find your local emergency planning committee; hazmat laws; how occupational safety, health and environmental professionals address this issue; and hazmat emergency response information.

Should an emergency occur, federal officials say the general public should first call 911 and, if one can identify the size and color of the placards on the transport vehicle without endangering their own safety, to provide that information to the authorities.

As for safety planning, there are State Emergency Response Commissions (SERC) who designate Local Emergency Planning Committees (LEPC) in most communities across the U.S. LEPCs are made up of local emergency service personnel, occupational safety and health professionals, and local officials who work to prevent and plan responses to accidental or deliberate chemical incidents. They are operated through the EPA. One can locate their LEPC by checking the EPA web site at http://www.epa.gov/ceppo/lepclist.htm.

For round-the-clock reporting of an incident, the U.S. National Response Center is open 24 hours a day, seven days a week and is where all chemical, radiological and etiological discharges into the environment are reported by calling 1-800-424-8802.

For a copy of the ASSE brochure, contact ASSE customer service at 847-699-2929 or e-mail customerservice@asse.org and ask for item number G017. The brochure can be downloaded for free off of ASSE's web site at http://www.asse.org/newsroom.

ASHRAE Publications

ASHRAE has published its 2004 refrigeration systems safety standard, which establishes procedures for operating equipment and systems to assure the safety of building occupants and system technicians. ANSI/ASHRAE 15-2004, *Safety Standard for Refrigeration Systems*, includes clarifications to the application of safety relief valves for pressure vessels as well as the addition of flammable refrigerant restrictions in comfort cooling applications that were omitted from the 2001 standard. In addition, references utilized in the standard were updated. The new standard clarifies requirements for the application of safety relief valves on larger vessels in excess of 10 cubic feet. The new wording on relief valve requirements for larger vessels removes any ambiguity. The standard includes prohibitions against the use of flammable refrigerants for applications for human comfort. Standard 15 was first published in 1919 as Tentative Code for the Regulation of Refrigerating Machines and Refrigerants in recognition of the need for cities and states to enact safety regulations.

ANSI/ASHRAE/IESNA Standard 90.1-2004, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, provides minimum requirements for the energy-efficient design of buildings except low-rise residential buildings. The standard contains a new informative appendix to rate the energy efficiency of building designs that exceed its minimum requirements. The guidance provided in this appendix should be beneficial to HVAC designers who are trying to achieve the required points for either a Silver or Gold Leadership in Energy and Environment Design (LEED) certification of a facility.

Changes to major sections of the standard include:

Lighting

- Revised interior lighting power limits are generally more restrictive than the 2001 standard values. The values are an average of 25 percent more stringent and will require more careful lighting design in some applications.
- A new exterior lighting section includes specific lighting power limits for a variety of exterior applications.

Mechanical

- The mechanical section has been reorganized to make it easier to read. New climate zone data further simplifies many of the mechanical requirements from economizer requirements to duct insulation.
- In addition, energy efficiencies were increased for fans, single package vertical units and 3-phase air-cooled air conditioners.

Climate Zones

- The number of primary climate zones for heating and cooling was reduced to eight from 26. Each county in the United States has been mapped to a particular climate zone. As a result, building envelope and mechanical criteria will apply on a countywide basis, and often to many adjacent counties.
- Reducing the number of primary climate zones resulted in a reduction of the number of tables of building envelope criteria. This reduction results in simplification while minimizing the changes in the building envelope criteria.

Energy Cost Budget (ECB) Method

- A new table reformats requirements to show the symmetry between simulations of a design building model to a budget building model in the ECB method. This makes it easier to determine the efficiency of the design.

Both standards may be purchased from ASHRAE or their web site at www.ashrae.org.

ARMY ITEMS OF INTEREST

Malaria Makes Comeback in U.S. Soldiers Returning From Afghanistan

HealthDayNews reported that malaria is cropping up again in the U.S. military. Some Army Rangers coming back from duty in Afghanistan have the disease, and medical experts cite the same reason that may have caused malarial cases to occur with most veterans from previous wars: Soldiers simply don't stick with their regimen of medications to suppress the disease. To prevent malaria, soldiers are instructed to take antimalaria medicine. Today's soldiers are also supposed to use personal protection, such as minimizing skin exposure and using bed nets and insect repellent. Researchers collected data on 725 U.S. Army Rangers sent to eastern Afghanistan between June and September 2002. Among these subjects, 38 developed malaria. When the researchers

asked how many of the soldiers maintained their regimen of medication, they found that only 52 percent took it while in Afghanistan and only 41 percent continued their treatment after returning. In addition, only 29 percent used insect repellent while in Afghanistan. View the HealthDayNews article at http://www.healthday.com/view.cfm?id=523367. (CHPPM HIO Weekly Update – January 14, 2005)

DoD Ergonomics Working Group News

Manufacturers often claim that back belts reduce injury risk by increasing pressure inside the abdomen, which stabilizes the back by stiffening the torso. However, recent studies reveal that the increased intra-abdominal pressure is associated with abdominal muscle contraction that, in turn, increases compressive force on the lower spine. Furthermore, it appears that back belt usage diminishes the amount of work produced by the back extensor muscles.

Back belt use is known to decrease spinal muscle activity. This decrease in muscle activity can lead to spinal muscle weakness if back belts are worn for prolonged periods. Therefore, the main risk associated with wearing a back belt is that during the period of wearing it, the supportive spinal muscles - the deep abdominal and back muscles that normally support your spine - will become weaker. These muscles are less active while your spine is being artificially supported by the belt, which in turn promotes atrophy of the back muscles.

Another known hazard of back belt use is increased cardiovascular risk. The mechanical compression of the back belt on the abdomen forces blood out of the trunk and into the rest of the body:

- People with high blood pressure are at risk directly due to increases in their already elevated blood pressure levels.
- People with low blood pressure are at risk indirectly because the body adjusts to the increased blood pressure that occurs while the belt is worn (cinched). After the belt is removed, blood pressure drops too low, and may cause the worker to become light headed or even faint.

Other considerations regarding back belts are back injury rates and back injury severity.

- Back injury rates are highest among users who wear a back belt then discontinue its use - in many cases, the back has developed a dependence on the back belt and muscles atrophy.
- People who suffer a back injury while wearing a back belt have the most severe injuries; their injury severity is greater than people who never wore a back belt and suffer a back injury and even more severe than people who suffer a back injury after discontinued back belt use.
- "Superman Syndrome," the mistaken belief that wearing a back belt makes you stronger, is a concern. Some injuries occur because people often mistakenly perceive that they can lift more weight when using a back belt. But research

indicates that people do not have the ability to lift more weight after receiving a back belt.

If back belts are distributed to people without a back injury, it should be done with care.

- The user should know what a back belt can and cannot do and the user should only wear the belt when performing a manual material handling activity. If back belts are prescribed as part of a physician's treatment plan, the worker's workstation should be evaluated to ensure the physical demands of the job do not exacerbate the back injury.

Conclusion

Multiple research organizations agree that there is not enough evidence to suggest that back belts reduce injury rates or prevent back pain for people who lift or move materials. Today, back belt manufacturers claim that back belts act as a "reminder" and should be used in conjunction with a comprehensive lift plan to reduce back injury rates. The truth is back belts are not needed as part of a comprehensive lift plan.

Medical professionals and ergonomists agree that you should wear a supportive belt only for the first few days or weeks after a severe back injury while the area is healing. If you have never had a back injury, it is best to avoid a back belt entirely. It is more important to focus on properly designing workstations; using proper form and posture when bending, lifting and sitting; and performing conditioning exercises regularly to keep your trunk muscles strong.

Blanket Use of Back Belts is Not Endorsed by The Surgeon General or the Department of Defense.

Obtain a copy of this Issue 39, January 2005 from the Working Group's web site at www.ergoworkinggroup.org.

ADMINISTRATIVE INFORMATION

This document was prepared for the U. S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), Directorate of Occupational Health Sciences. The POC at the USACHPPM is Sandy Monk; Program Manager; Industrial Hygiene Management Program; DSN: 584-2439; COM: 410.436.2439; e-mail: Sandra.Monk@apg.amedd.army.mil.

This document summarizes information and regulatory actions that are relevant for Army Industrial Hygiene Program personnel. We distribute this summary in electronic form only. Please make it available to your staff if they do not have direct access to an electronic copy. If you would like to be added to the electronic mailing list or if your email address changes, please contact Sandy Monk, e-mail: Sandra.Monk@apg.amedd.army.mil; or call her at DSN: 584-2439; COM: 410.436.2439; fax: 410.436.8795.

At a minimum; we review the following publications in preparing this summary: Journal of Occupational and Environmental Hygiene; the Synergist; Today (ACGIH's Newsletter); The ABIH News; OSHA Week; the Federal Register; BNA OSHA Reporter; The Journal of Occupational and Environmental Medicine; The Journal of Environmental Health; Professional Safety; Occupational Hazards; Occupational Health and Safety; and Industrial Safety and Hygiene News. We also gather information from a variety of sources on the Internet.

If you have questions or comments; please contact Dean Taiani at dtaiani@lmi.org; 410-273-2605 or fax 410-273-7587.